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Does entrepreneurship pay for women and immigrants? A 30 year assessment of the socio-economic impact of entrepreneurial activity in Germany

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ABSTRACT

Using data from the German Socio-Economic Panel from 1984 to 2012, we explore income effects of self-employment for females and migrants. Controlling for the selection into self-employment, we differentiate the overall earnings differential between the self-employed and the wage-employed into an endowment effect (they are equipped with characteristics that positively affect earnings in either occupation) and a treatment effect (the income effect solely due to the decision for self-employment). We find that women exhibit both a lower treatment effect and a lower endowment effect than men. Migrants benefit much more from entrepreneurial activities than Germans, having a significantly higher treatment effect. Among the countries of origin, Turkish migrants benefit the most from their self-employment decision, while southern Europeans exhibit the lowest income relevant skills.

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1. Introduction

Entrepreneurship is seen as an economic engine that may induce economic growth and prosperity. More entry implies economic change and development and may ensure more equitable income distributions (Baumol 1996). Not surprisingly then entrepreneurship is the mainstay of very many political campaign speeches (Honig 2016).

Yet, entrepreneurial activity is agentic and selective in nature, skills, motivation, volition and attitude are paramount and represent a strong impetus for an entrepreneurial career (Schjoedt and Shaver 2007). McCloskey (2010) attributes periods of substantial growth to changes in rhetoric and cultural environments that enriches personal growth and opportunities first to subsequently affect economic prosperity. Though criticizing an ever increasing wedge between the rich and the poor, Piketty (2014, 441) notes that within the Forbes list of the very rich, 'several hundred new fortunes appear in [the $1 billion to $10 billion] range somewhere in the world almost every year'. In fact, it appears that entry into

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entrepreneurship is democratic, with the better skilled reaping the benefits of their very own human capital. That is, apart from institutions setting boundaries and creating incentives, individual, person-specific variations matters in explaining entrepreneurial activity.[1]

Still, while various transformations in the economic and institutional environment may have created incentives to become an entrepreneur, it may not necessarily have equipped all and sundry with the set of skills necessary to strive when embarking on such an entrepreneurial endeavour. Against this background, we believe that especially the study of gender, migration, and cultural heterogeneity is warranted from several perspectives. Firstly, it revolves around the moral and philosophical discussion about equality of rights between men and women (Verheul, van Stel, and Thurik 2006; Field, Jayachandran, and Pande 2010). Secondly, women and minority poverty presents a serious social problem that calls for institutional reforms (Estrin and Mickiewicz 2011; Aliaga-Isla and Rialp 2013; Storti 2014).

In doing so, we employ a counterfactual perspective. We set forth, that there are crucial individual person-specific skills that at the same time would affect earnings regardless of occupational choices, such as general human capital. We label this the endowment effect. We therefore measure the difference in earnings between the self-employed and the wage-employed if both were wage-employed: that is empirically holding the decision constant and varying only the characteristics. The higher this endowment effect, the more able and/or willing highly-skilled individuals are to enter self-employment.

We choose the case of Germany to study these effects. Germany ranks second in migration popularity behind the US (Webb 2014). The country's immigration rules have become the most lenient in the OECD. Over the recent years, it has witnessed an increased migration from Southern European countries and EU-neighbouring countries like Turkey (Constant, Shachmurove, and Zimmermann 2005; Leicht, Berwing, and Langhauser 2015). Similarly, it has witnessed strong increases in entrepreneurial activity (Fritsch, Kritikos, and Sorgner 2015). As such, Germany offers the unmatched potential to study earnings patterns within the host country thus enlightening the debate on the potential of self-employment for migrants and their socio-economic advancement. Also, Germany granted universal suffrage as early as 1918 (with Denmark being the first European country to allow full women suffrage in 1915), yet it still reports the third highest gender pay gap in the European Union (European Union 2014, 12, 13).

Using data from the German socio-economic panel on 24,651 individuals during the time period 1984–2012, we firstly find that entrepreneurs earn 19% more than individuals with corporate jobs. When disentangling this effect on income, we find that entrepreneurs exhibit a positive endowment effect, indicating that they would have earned a higher income even if they had not decided to become an entrepreneur. This effect is explained by the possession of higher income-relevant characteristics such as education or previous work experience that are also relevant for income in wage-employment, yet impacts may differ. Overall, this effect accounts for an income differential of some 16%. The endowment effect accounts for the biggest part of the overall earnings differential. As to several sub-group analyses, we find that the endowment effect is smaller for female entrepreneurs. Also, we document that the endowment effect for migrants is positive, yet significantly smaller than for Germans. Lastly, we document time trends in endowment effects that account for changes in the cultural environment and political landscape. We find that differences between males and females become smaller, and migrants benefit from the EU integration, yet the effects declined ever since the 1999 Amsterdam Treaty and the 2004 EU east enlargement. Also we find that

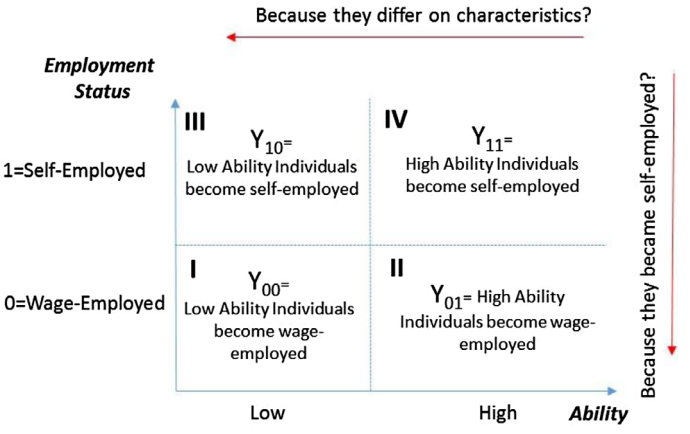

Figure 1. Entrepreneurial characteristics and outcome comparison.

migrants benefit much more from entrepreneurial activities than Germans, having a significantly higher treatment effect. Among the countries of origin, Turkish migrants benefit the most from their self-employment decision, while southern Europeans exhibit the lowest income relevant skills. Though, with more and more migration and the expansion of the European Union to eastern European countries, returns to entrepreneurship appear to decline.

We now go on with theoretical considerations, leading to our hypotheses in Section 2. Afterwards, we describe our data and method in Section 3. The results are presented in Section 4. We discuss and develop implications in Section 5 and conclude in Section 6.

2. Theory and hypotheses

2.1. Selection into and performance in entrepreneurship

Do self-employed individuals earn more than individuals that stay wage-employed? And if so, is this due to the choice they made in the first place to become self-employed or because of the skills they bring into their profession? Comparing outcomes between the self-employed and the wage-employed is tedious since individuals self-select their career path. Those that have higher skills or motivation and tenacity should strive in either entrepreneurial activities or wage-employment (Davidsson and Honig 2003). The literature implicitly suggests that the antecedents to entrepreneurial activity may actually lead to ambiguous outcomes. Though, highly educated individuals are more likely to start their own business, they should also be more attractive to potential corporate employers (Lucas 1978). In fact, if individuals who became an entrepreneur had chosen to stay wage-employed, wouldn't her skills and aspirations still put her in a favourable position? Research in entrepreneurship argues for 'Jack-of-all-trades' characteristics of entrepreneurs (Lazear 2004, 2005) while the very same skill set is highlighted for leaders in management positions alike (Lazear 2012). In essence, skills that are useful in entrepreneurial settings are unlikely to deteriorate when applied in a corporate environment.

Therefore, comparisons between self- and wage-employment cannot assume that these were randomly chosen. This may subsequently distort empirical estimates. In fact, endogeneity obscures us from observing the counterfactual state, namely what would have

happened to the individual under investigation had she taken a different route. If the control group (the wage-employed) differs on core characteristics, the control group is unlikely to provide the counterfactual state for those who decided to become entrepreneurs. Yet, we need to make inferences about the counterfactual state to determine how an individual would have fared had she taken a different decision. Within-person variation is more important than between-person variation.

Figure 1 summarizes our thoughts. Suppose there is only an exogenous decision to become self-employed, the group of wage employed individuals then presents the control group and also the counterfactual (what would have happened to the self-employed had they been wage-employed). If outcome differences between the groups exist, recommendations can be made whether or not self-employment pays. Theoretical predictions would therefore focus on whether the difference is positive or negative, and implications follow directly.

However, if the decision to become self-employed has antecedents and therefore is selective, matters are complicated by this very selection. Firstly, we argue that self-selection among entrepreneurs is likely to be a strong factor in explaining why individuals earn more/less when entering self-employment. Not accounting for these antecedents may hamper an accurate estimate of the earnings differential. Secondly, accounting for these individual characteristics is important when deriving the conditional estimates, as particular skills (or lack thereof) employed in entrepreneurship might equally benefit (or harm) an individual's earnings even if she were wage-employed.

Suppose for example, that the population is heterogeneous in their abilities and that only the high ability individuals become self-employed (the case can be extended to more variables easily, see Sobel (1996)). A comparison between the outcome in quadrant IV and in quadrant I is possible but it coalesces the differences in abilities *and* decisions taken into one single estimate: Which is theoretically uninteresting because one does not know whether the decision or its antecedents caused a likely difference in earnings.

Underneath a simple bifurcated comparison lie at least two more interesting and practically relevant research questions. Namely (a) what is the treatment effect; the difference in actual earnings for the self-employed and the earnings they would have received if they were not self-employed (holding the characteristics constant and varying only the decision; counterfactual comparison between quadrant IV and quadrant II)? And (b) what is the endowment effect; the difference in earnings between the two groups if both were wage-employed (would only differ in their abilities; but not in their decision: comparing quadrant IV and quadrant III)?

Taken together, this implies that the process of understanding the impact of decisions taken for either occupation is indeed more complex. Firstly, individuals should estimate the difference in actual earnings they might generate when deciding for an entrepreneurial career and the earnings they would have received if they (given their very skill endowments) were not entrepreneurs (Brixy, Sternberg, and Stüber 2012). In fact, only in comparison with a valid (though person-specific) alternative can individuals make informed decisions. In fact, whatever the skill set looks like, it provides benefits in both entrepreneurship and wage-employment, and only the (person-specific) marginal value of this very skill set will differ (independent of decisions and skill-sets of other individuals). The relative assessment drives the selection, not just the absolute order of magnitude of either choice. Such an answer

provides insights for practitioners and policy makers that go beyond answers derived from the common approach that coalesces endowment and impact effects into a single estimate.

The question that we address subsequently is whether the individual level determinants of entry and the income generated in entrepreneurship are of similar magnitude for all entrepreneurial individuals, by studying differences in gender, migration, and cultural backgrounds. Hence, despite achieving more entrepreneurial activity at large, it is important to also achieve balance and cohesion among population subgroups.

2.2. Gender and endowment and treatment effects

With respect to the supply of female entrepreneurs (or the lack thereof) there is evidence highlighting the underutilization of female entrepreneurship potential (Marlow, Carter, and Shaw 2008; Greene, Han, and Marlow 2013). In fact, despite evidence that more and more women start to see entrepreneurship as a career option the overall rate of entrepreneurship is still substantially lower for women than it is for men (Minniti, Arenius, and Langowitz 2004; Allen et al. 2008).

The reasons are still disputed in the literature. Research by Kirkwood (2009), for example, explores whether differences in push (negative precursors that can range from a divorce to being passed over for promotion) and pull factors (seeing an opportunity) are more prevalent among male or female entrepreneurs. In sum, the findings suggest no significant differences in the explanatory power of push and pull factors on the propensity to become an entrepreneur between men and women. Often invoked arguments therefore also focus on gender stereotyping that presents a hindrance for women to choose an entrepreneurial career. More importantly though, women are more likely to invoke their family as a primary reason for entering into entrepreneurship. Women consider entrepreneurship as an option so long as the job does not interfere with the 'motherhood' aspects of their lives (de Bruin, Brush, and Welter 2007). For women entrepreneurial aspirations are reflective of relational aspects that drive their career choices, rather than a pure focus on pecuniary aspects of the envisioned career path (Lirio et al. 2007). Women focus generally less on monetary aspects when thinking about an entrepreneurial career (Marlow 1997; Clain 2000). As Adkins et al. (2013, 197, Bracket added to original quote) note this may '[…] limit business growth to ensure that balance [needs of work vs. needs of family]) remains in place'. Rather, women focus on the non-monetary aspects of the job, e.g. time flexibility (Georgellis and Wall 2005) and are therefore more willing to leave money on the table when choosing for an entrepreneurial career. Bird and Brush (2002) therefore conjecture that while male run businesses focus on control and hierarchy female run businesses would exhibit flatter structures and be characterized by relational (or nurturing) policies. Empirical evidence documents that rather than focusing on growth prospects first and foremost, female owners influence organizational culture and work policies to be consistent with personal aspirations and family status (Adkins et al. 2013). Reasons for an entrepreneurial career might therefore differ between males and females and aspects related to non-economic benefits might be more prevalent for female entrepreneurs.

All of the above would therefore imply that treatment effects are significantly lower for female entrepreneurs in comparison with male entrepreneurs. Hence, we formulate the following hypothesis:

Hypothesis 1a: Female entrepreneurship is (relative to male entrepreneurship) associated with a significantly lower treatment effect.

While motivational factors may differ between males and females, so might endowments when becoming an entrepreneur. Consequently, this also reflects back on the difference between earnings in entrepreneurship and the earnings females could have earned in corporate environments. Entrepreneurship is often described as a '[…] persistent masculinized social construction of the stereotypical entrepreneurial persona' (Greene, Han, and Marlow 2013, 688), which generally favours males over females. Not surprisingly then, the entrepreneur is described using terms such as risk, aggression, or competitiveness (Ahl 2007; Greene, Han, and Marlow 2013). Similar evidence can be found in the literature on the gender wage gap. Standard hiring practices are prone to discrimination based on sex (Weichselbaumer 2003; Weichselbaumer and Winter-Ebmer 2007). Studies have shown that upon hiring women receive lower wages than equally able men (Weichselbaumer and Winter-Ebmer 2007). It has also been shown that when restrictions for women are relieved (for example through female political leadership or changes in regulatory environments), entry into self-employment increases (Goltz, Buche, and Pathak 2015; Yousafzai, Saeed, and Muffatto 2015).

Also, and despite being critical in transmitting future attitudes, behaviours, and beliefs (Fairlie and Robb 2007) there is an insufficient number of role models for female entrepreneurs (Minniti and Naudé 2010). Due to a lack of relevant channels of skill and trait transmission, females may therefore lack success-relevant skills for an entrepreneurial career (Terjesen 2005; Minniti and Naudé 2010; Greene, Han, and Marlow 2013). Consequently, Terjesen (2005) and Lee and Rendalli (2001) find that women have less managerial experience which limits the identification of better opportunities and thus the successful enactment of ideas (Ucbasaran, Westhead, and Wright 2008). In sum, those women, though supposed to act as leaders, might be insufficiently equipped with both, human and social capital (McGowan et al. 2015).

Entrepreneurship therefore is by and large a male driven phenomenon and women see (or perceive) themselves less often as entrepreneurs (Verheul, van Stel, and Thurik 2006). Evidence shows that fewer women than men own and manage businesses worldwide (Minniti and Naudé 2010). Male run businesses are often times larger and differ in sectors (Kepler and Shane 2007). Female run businesses grow less (Coleman 2007), receive less financial capital (Marlow and Swail 2014), and are less profitable (Robb and Wolken 2002; Minniti 2009). Due to the restraints women put on themselves, discrimination, or social norms (characteristics that determine earnings regardless of employment sector choice) we would therefore posit that the endowment effects differ between male and female entrepreneurs such that female entrepreneurship is associated with a lower endowment effect.

This leads to hypothesis 1b:

Hypothesis 1b: Female entrepreneurship is (relative to male entrepreneurship) associated with a significantly lower endowment effect.

2.3. Migration status and endowment and treatment effects

A substantial body of the literature suggests that individual wealth and education present strong predictors of entry in entrepreneurial activity (Lofstrom, Bates, and Parker 2014). Surprisingly though the lack of education and/or access to financial resources has not been

shown as a hindering factor for minorities to become entrepreneurs (Lofstrom and Bates 2013). Rates of entrepreneurial activity differ markedly between different groups comparing migrants and non-migrants or variations in entrepreneurial activities/outcomes across races. Comparing black and white entrepreneurs in the US, Kollinger and Minniti find blacks to be '[…] 1.79 times more likely to be nascent entrepreneurs than whites with an identical socio-economic background' (2006, 16). Data from the panel study of entrepreneurial dynamics paints a similar picture with prevalence rates being twice as high for black than for white entrepreneurs (Reynolds et al. 2004, 274). Lofstrom and Bates (2013, 76) therefore conclude that 'Traditional resource-constraint explanations for the low self-employment entry rates describing black Americans simply lack credibility when applied to highly educated elite subgroups'. Similar evidence has been reported for the UK, showing that migrants have higher chances to found a new business (Levie 2007), ethnic minorities are over-represented in the nascent population in the US (Kim, Aldrich, and Keister 2006), and immigrants with foreign passports are more likely to be self-employed than native Germans (Constant and Zimmermann 2006).

Lofstrom and Bates (2013) report that endowments determine the industries in which one selects into and that education increases the chances to enter and prevail in high entry barrier industries. Hence, those that ought to be at an educational (or wealth) disadvantage are more likely to select into low-barrier industries. Yet, we would argue that conditioning on entrance and outcomes obfuscates from the causal mechanism that most researchers are interested in, namely what would have happened to the migrant entrepreneur had he stayed wage-employed.

In fact, the often mentioned difficulties in finding suitable sources of financing or a likely lack of educational background would prevail even if the very individual had stayed wage-employed. Levie (2007) highlights the disadvantages of migrants related to poor language skills and likely unrecognized qualifications. Hence, rather than being lured into entrepreneurship they are more likely than not being pushed into entrepreneurship due to lack of alternative opportunity. All in all it therefore stands to reason that the endowment effect is likely to be lower in comparison with non-migrants. Migrants would have earned a substantially lower wage even if they had stayed wage-employed (in comparison with non-migrants).

Similarly, migrants may be expected to make a deliberate choice when selecting into entrepreneurship weighing their corresponding alternative opportunities. One of the most often cited motives for migration across countries is economic in nature. Migrants move because the economic benefits in the new location outweigh the economic alternatives in the old location. Hence, rather than staying put one moves to improve one's living conditions, despite the hardship this may bring about. Economic migration appears to be fairly prevalent in continental Europe (Levie 2007) and migrants might move into entrepreneurship when they feel discriminated, thus using entrepreneurship as a path for socioeconomic advancement (Constant and Zimmermann 2006). One would therefore expect that migrants opt for an entrepreneurial career mainly for economic reason (Block, Sandner, and Wagner 2011). Upon deciding for entrepreneurship immigrants have access to ethnic enclaves and can serve the needs of people within the same ethnic group better (Parker 2004). We therefore hypothesize:

Hypothesis 2a: Migrant entrepreneurship (relative to non-migrant entrepreneurship) is associated with a significantly larger treatment effect.

Hypothesis 2b: Migrant entrepreneurship (relative to non-migrant entrepreneurship) is associated with a significantly lower endowment effect.

3. Data and methodology

In the following, we present our data, variables used, and describe the methodology we employ to test the hypotheses. We briefly discuss how we deal with endogeneity in our econometric approach and how we derive the individual endowment and treatment effects.

3.1. Data

We explore data of the German Socio-Economic Panel (SOEP), which is a representative data-set of German households.[2] Since the panel survey already started in 1984 and we use data up to 2012, we are able to use information that covers almost three decades. Several historical events both on the European and national level such as the German reunification and important changes in the regulatory environment such as the introduction of the unified product and labour market in Europe occurred during this period of time. We explore their impact on endowment and treatment effects, as well as possible time trends.

The GSOEP interviews all members of a representative sample of private households. Topics of the survey include the current job, individual lifestyles, and general attitudes, for instance. In particular, we can identify self-employed individuals. In line with the extant literature we understand self-employment in a rather broad fashion that comprises all individuals who run their own business (Hamilton 2000; Astebro and Chen 2014). Following previous research (see for example Hamilton 2000; Van Praag, van Witteloostuijn, and van der Sluis 2013; Astebro and Chen 2014; Caliendo, Fossen, and Kritikos 2014), this variable adopts a binary form, whereas the value '1' indicates a self-employed individual. All wage-employed people form the comparison group with the value '0'. We also apply several restrictions to our control group in the sample from which we derive the counterfactual estimates. We only consider fulltime employees who are not apprentices or trainees and who do not work in the agricultural sector at the time of the survey. Altogether, our data-set has an unbalanced and repeated cross-sectional design with 160,938 year-observations of 24,651 different individuals. We have 12,638 year-observations (e.g. a share of 7.9%) of 2634 different people.

The SOEP provides full information on the income of workers. In terms of earnings of the wage-employed, the variable includes all wages and salaries. The self-employed are asked about the financial funds that they draw from their firm for their personal purposes. Thus, in both cases the wage-/self-employed is able to dispose directly over the money so that both kinds of income are comparable. We use monthly earnings in the prices of 2012 (the latest year of our sample) for our main analyses.

3.2. Methodological approach

3.2.1. Baseline framework

In the following we treat the occupational choice as self-employment (1) and wage-employment (0). The earnings within each regime are denoted by Y. The individuals who choose self-employment are considered as 'treated'. Hence, each choice (moving to self-employment) results in Y_1 if self-employment had been chosen. Similarly, if the individual

Table 1. Sample.

Variable	Wage-employed (148,068)	Self-employed ($n = 12{,}622$)
Ln(gross monthly income in prices of 2012)	7.85	8.04
Socio-demographic characteristics		
Female (1 = yes)	0.332	0.247
Migrant (1 = yes)	0.163	0.095
Married (1 = yes)	0.668	0.729
Child under 16 in household (1 = yes)	0.382	0.410
Age (in years)	40.5	44.9
Satisfaction with health (from 0 'totally dissatisfied' to 10 'totally satisfied')	7.01	7.02
Human capital		
Schooling (in years)	12.0	13.1
Fulltime experience (in years)	17.8	20.5
Parttime experience (in years)	0.772	1.01
Unemployment experience (in years)	0.374	0.404
Job-specific factors		
In occupation trained for (1 = yes)	0.582	0.638
Tenure (years)	11.3	10.4
Weekly working time (h)	42.9	51.9
Entrepreneurial activities of the parents		
Father self-employed (1 = yes)	0.080	0.182
Mother self-employed (1 = yes)	0.008	0.018

chose to stay wage-employed, the earnings Y_0 would be observed. Earnings in both occupations are dependent on several determinants X; we allow the influence on earnings to differ across the regimes. Thus, our baseline model can be described by[3]:

$$Y_1 = X_1\beta_1 + \varepsilon_1 \quad \text{Earnings in self-employment} \tag{1}$$

$$Y_0 = X_0\beta_0 + \varepsilon_0 \quad \text{Earnings in wage-employment} \tag{2}$$

We include three categories of income determinants in the vector X: (1) socio-demographic characteristics including gender, migration status, marital status, the presence of children in the household, age, and satisfaction with health, (2) indicators of human capital comprising schooling, work experience, as well as unemployment experience, and (3) the job-specific factors tenure, working time (which can also be seen as a proxy for effort) and the information whether the individual works in the job she is trained for. We also control for sectors, the geographical region and the year of observation. Average numbers are tabulated in Table 1, we relegate a more detailed overview of variable definitions and explanations to the Appendix.

To start with we provide estimates of our baseline analysis that does not explicitly account for self-selection effects. We therefore estimate two equations with (Mincer-type) OLS regressions, using logged income values as dependent variables to reduce the impact of outliers. Coefficients of regression models with a logged dependent variable can be interpreted as (approximately)[4] percentage changes when the independent variable is increased by one unit.

The coefficients of these OLS regressions then provide the basis for the well-known Blinder–Oaxaca decomposition (Blinder 1973; Oaxaca 1973). The starting point is the overall earnings differential, the difference in average earnings of the self-employed and the wage-employed: $\text{Diff} = E\left[Y_1|X_1\right] - E\left[Y_0|X_0\right]$. The endowment effect indicates the part of the

differential that can be attributed to different endowments with income-relevant characteristics. Thus, it illustrates the comparison between (1) the counterfactual income that the self-employed would earn in wage-employment given their characteristics and the coefficients of the wage-employed and (2) the actual income of the wage-employed: $\text{Endow} = E\left[Y_0|X_1\right] - E\left[Y_0|X_0\right]$. The treatment effect is then the remaining part of the overall differential, namely the change in earnings of the self-employed if they were wage-employed: $\text{Treat} = E\left[Y_1|X_1\right] - E\left[Y_0|X_1\right]$.

3.2.2. Accounting for selectivity

Comparing outcomes when decisions are endogenous is tedious since individuals self-select their strategies. Empirical comparisons cannot assume that strategies were randomly chosen. Endogenous choices based on ability, experience, or motivation, would imply that individuals who did not become an entrepreneur (and stayed wage-employed) cannot necessarily provide the counterfactual, as a comparative difference in skills could make self-employment a worthwhile endeavour for one, but not for the other. Even if cognitive heuristics are present in start-up environments (Busenitz and Barney 1997) and decision-making errors are common and cause severe biases (Franke et al. 2006) decisions are not purely exogenous. If experience, for example, affects the likelihood of self-employment and the subsequent earnings generated simultaneously, the error terms of the decision to become self-employed are correlated with the outcome regression (earnings) (Dencker, Gruber, and Shah 2009; Unger et al. 2011). Thus, coefficients from regressions that fail to accommodate for endogenous choices are likely biased, which may cause facile inferences (Hamilton and Nickerson 2003).

The baseline approach laid out above would neglect this very selectivity of being self-employed. We therefore extend our model by a selection equation:

$$\text{SE}^* = Z\gamma + u \quad \text{Selection equation} \tag{3}$$

SE is a dummy indicating whether an individual is self-employed or wage-employed. Z is a vector of factors that influence the decision to become self-employed. We then estimate the three equations simultaneously with an endogenous switching regression so that the coefficients in the two earnings equations are corrected for selectivity.[5]

Subsequently, we follow the exposition in Poon, Lee, and Gup (2009) in defining the endowment and treatment effect. Expected earnings are conditional on the selection into self-employment, instead of being unconditional expectations in the basic Blinder–Oaxaca case. Hence, the endowment effect is defined by $\text{Endow} = E\left[Y_0|\text{SE} = 0, X_1\right] - E\left[Y_0|\text{SE} = 0, X_0\right]$, whereas the treatment effect is computed as follows: $\text{Treat} = E\left[Y_1|\text{SE} = 1, X_1\right] - E\left[Y_0|\text{SE} = 0, X_1\right]$.[6]

In doing so, we can compare the results from the basic (non-selection adjusted) Oaxaca–Blinder approach to the selection-adjusted estimates. We explore differences across subsets of our population, following our theoretical considerations. Therefore, we restrict the sample to the subgroup in question and repeatedly perform the estimation. We differentiate between women and men as well as between Germans and individuals with a direct migration status.

In separating the different migration groups, we focus on migrants from Turkey, Southern Europe, and West/North Europe. These distinctions are important because they depict different trends as to self-employment patterns. Turkish immigrants have for a long time been

characterized as the largest (and dominant) immigration group in Germany (Constant, Shachmurove, and Zimmermann 2005). Southern European countries (especially Spain) tend to have the strictest business and self-employment regulations among all OECD countries (Congregado, Golpe, and Carmona 2010). Migration thus may present an opportunity for some individuals to overcome the lack of employment opportunities in their home countries and to leverage their human capital in another labour market. This is especially important when considering that southern European countries, such as Spain, Portugal or Greece report high unemployment rates, lower female labor market participation and low returns to entrepreneurial activity. Grilo and Irigoyen (2006) also report that entrepreneurial intentions to become self-employed are high in southern European countries (Preference for self-employment: Spain: 65%, Portugal: 72%, Italy: 60, Greece: 74%, Germany: 48% of total population). Yet, opportunities are low, which leads to high latent entrepreneurship.

Lastly, we contrast these results with northern European immigrants that are described as having entrepreneurial opportunities in their home countries. For example, in a cross-national comparison of entrepreneurial activity, Acs, Autio, and Szerb (2014) show that northern European countries (3rd and 4th for Denmark and Sweden) rank much higher on entrepreneurial activity than southern European countries (28th and 29th for Spain and Portugal) and Turkey (35th) in comparison to Germany (16th). Hence, the self-employed individuals coming from these countries may differ from other migrants.

4. Results

4.1. Baseline estimates

In the following, we present the results of our empirical analyses.

Table 1 reports that earnings of the self-employed are considerably higher than those of the wage-employed. The difference amounts to 19% or about 600€ related to the average income of about 2900€ for wage-employed workers. Noteworthy, the share of women and migrants in the self-employed group is lower than in the wage-employed group. The self-employed are, on average, slightly older which coincides with a longer fulltime work experience. More often, they work in a job they were trained for, and they work longer hours than the wage-employed.

Table 2 presents the results for the first stage estimates involving the selection into self-employment, and the conditional estimates on earnings in self-employment and wage-employment, respectively. Correspondingly, Table 4 then presents the decomposition into endowment and treatment effects using the Oaxaca–Blinder variant and the endogenous switching model, respectively.

Starting with Table 2, we can infer that in line with predictions from human capital theory, we see that schooling (as a measure for general human capital) positively affects the selection into entrepreneurship with a coefficient of $\gamma = 0.034$. Thus, one additional year of schooling is associated with a higher probability of being self-employed. Schooling also impacts earnings both in self-employment and wage-employment. The coefficients indicate that one additional year of schooling is related to an income increase of 4.9% (= exp(0.048)−1) in self-employment and 6.3% in wage-employment. Thus, formal education seems to be relatively more important in wage-employment. Fulltime experience (as a measure of task-specific human capital) negatively affects the decision to become

Table 2. Earnings regressions (*monthly income*) – Endogenous switching model.

	Endogenous switching model		
	1 = self-employed	Income in Self-employment (Y_1)	Income in Wage-employment (Y_0)
Schooling	0.034*** (0.002)	0.048*** (0.003)	0.061*** (0.0004)
Fulltime experience	−0.017*** (0.001)	0.007*** (0.002)	0.002*** (0.0003)
Parttime experience	−0.001 (0.002)	−0.008** (0.003)	−0.007*** (0.0005)
Unemployment experience	−0.022*** (0.006)	−0.060*** (0.006)	−0.029*** (0.001)
Female	−0.074*** (0.015)	−0.300*** (0.017)	−0.175*** (0.002)
Migrant	−0.099*** (0.019)	0.088*** (0.021)	−0.045*** (0.003)
Married	−0.027** (0.014)	0.064*** (0.015)	0.044*** (0.002)
Child	0.175*** (0.013)	0.096*** (0.016)	0.054*** (0.002)
Age	0.046*** (0.001)	−0.002 (0.002)	0.005*** (0.0003)
Satisfaction with health	0.020*** (0.003)	0.020*** (0.003)	0.006*** (0.0005)
In occupation trained for	0.127*** (0.012)	0.002 (0.015)	0.061*** (0.002)
Tenure	−0.010*** (0.001)	0.002*** (0.001)	0.005*** (0.0001)
Weekly working time	0.041*** (0.001)	0.008*** (0.002)	0.008*** (0.0002)
Father self-employed	0.399*** (0.017)		
Mother self-employed	0.037 (0.051)		
Industry and public sector dummies	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Constant	−5.115*** (0.079)	6.739*** (0.253)	6.295*** (0.013)
Observations		160,690	
Rho		−0.030*** (0.006)	0.069 (0.080)
Wald test of independent equations		$\chi^2(1) = 25.17$, Prob > $\chi^2 = 0.000$	

Note: Robust standard errors in parentheses.
*Significant at the 10% level; **significant at the 5% level; ***significant at the 1% level.

self-employed ($\gamma = -0.017$), yet exhibits a positive effect on income in both regimes. However, the impact in self-employment ($ß_1 = 0.007$) is much higher than in wage-employment ($ß_0 = 0.002$). Similarly, tenure effects the selection negatively ($\gamma = -0.010$), but both incomes positively ($ß_1 = 0.002$; $ß_0 = 0.005$). In fact, those that already spent a very long time in their current jobs (or the labor market in general) are less likely to become self-employed, yet gain more for their experience regardless of the occupation chosen. Also we find that individuals that work in the occupation they were trained for, are more likely to become entrepreneurs ($\gamma = 0.127$). The income effect is strong and sizeable, yet it only benefits those that stay wage-employed ($ß_0 = 0.061$), and does not exhibit a significant effect on income in self-employment. Effort, as proxied by the number of weekly working hours affects the selection positively ($\gamma = 0.041$) and exhibits a similar positive effect on income in both occupations ($ß_1 = ß_0 = 0.008$).

Previous unemployment experience exhibits a strong negative effect on selection into self-employment ($\gamma = -0.023$), and also decreases earnings for the self- and wage-employed ($ß_1 = -0.060$, $ß_0 = -0.030$). A similar effect can be found for those that only worked part-time. Part-time work experience does not affect the selection, but affects earnings negatively regardless of occupation ($ß_1 = -0.008$; $ß_0 = -0.007$). An excessive level of part-time experience and previous periods of unemployment are detrimental for the income in both regimes.

When looking at the effect of person-specific information included, we can infer that females ($\gamma = -0.074$), migrants ($\gamma = -0.099$), and married ($\gamma = -0.027$) individuals are less likely to select into self-employment. Females earn considerably less in either self- or wage-

Table 3. Earnings regressions (*hourly income*) – Endogenous switching model.

	Endogenous switching model		
	1 = self-employed	Income in Self-employment (Y_1)	Income in Wage-employment (Y_0)
Schooling	0.048*** (0.002)	0.051*** (0.004)	0.056*** (0.0005)
Fulltime experience	−0.012*** (0.001)	0.003 (0.002)	0.002*** (0.0003)
Parttime experience	−0.004 (0.002)	−0.005* (0.002)	−0.005*** (0.001)
Unemployment experience	−0.033*** (0.005)	−0.057*** (0.007)	−0.028*** (0.001)
Female	−0.231*** (0.014)	−0.261*** (0.022)	−0.143*** (0.002)
Migrant	−0.145*** (0.018)	0.092*** (0.025)	−0.009*** (0.003)
Married	−0.006 (0.014)	0.038*** (0.016)	0.034*** (0.003)
Child	0.195*** (0.123)	0.094*** (0.019)	0.054*** (0.002)
Age	0.043*** (0.001)	0.005 (0.003)	0.005*** (0.0003)
Satisfaction with health	0.015*** (0.003)	0.020*** (0.003)	0.007*** (0.001)
In occupation trained for	0.111*** (0.012)	0.001 (0.016)	0.063*** (0.002)
Tenure	−0.138*** (0.001)	0.001 (0.001)	0.006*** (0.0001)
Father self-employed	0.435*** (0.016)		
Mother self-employed	0.042 (0.049)		
Industry and public sector dummies	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Constant	3.175*** (0.060)	1.411*** (0.249)	1.143*** (0.012)
Observations		160,690	
Rho		−0.013 (0.009)	0.128 (0.094)
Wald test of independent equations		$\chi^2(1) = 3.64$, Prob > $\chi^2 = 0.057$	

Note: Robust standard errors in parentheses.
*Significant at the 10% level; **significant at the 5% level; ***significant at the 1% level.

employment ($ß_1 = -0.300$; $ß_0 = -0.176$), while migrants may even earn more in self-employment ($ß_1 = 0.088$) but less in wage-employment ($ß_0 = -0.045$). Married individuals earn more in either occupation ($ß_1 = 0.063$; $ß_0 = 0.043$). This effect is also reported for individuals with children, though these select more often into self-employment ($\gamma = 0.175$). Lastly, we find older individuals to be more likely to select into self-employment ($\gamma = 0.046$) and to earn more in wage-employment ($ß_0 = 0.005$). Individuals who are more satisfied with their health are also more likely to be self-employed ($\gamma = 0.020$) and to earn more regardless of occupational choices ($ß_1 = 0.020$; $ß_0 = 0.006$). As to the other variables included, we find that those with entrepreneurial parents are much more likely to select into self-employment. Yet, the effect differs between fathers that were entrepreneurs ($\gamma = 0.399$) with a positive effect, and mothers, with an insignificant effect.

In the above, we focus on monthly earnings instead of hourly income. This is based on the assumption that it is more important to know what people can earn in total per month, especially as consumption choices are by and large derived from monthly income (Pischke 1995). Yet, differences in outcomes may carry important practical implications when individuals are trading off the financial benefits of entrepreneurship against longer working hours, among other things. We re-estimated our models with the gross earnings per hour in prices of 2012 as dependent variable on the income stage while dropping working hours as an independent variable. Importantly, as one can infer in Table 3, all coefficients remain invariant to the alternative approach taken using hourly income and differ only marginally in size. Hence, we believe this attests to the robustness of our findings.

4.2. Endowment and treatment effects

Following our previous exposition in Section 3.2.2, we employ a selection equation to compute the endowment and treatment effects. We contrast our results with the (likely biased) results from unconditional OLS-type regressions. Results are presented in Table 4.

Firstly, we can infer that despite being positive and significant the basic model underestimates the treatment effect ($ß = 0.012$) by around 60%. The switching model indicates a percentage gain of some 3% in income for the self-employed. Even more important, the endowment effect (income differences to the wage-employed that are caused by income-relevant characteristics) is 16%. Hence, even when controlling for selection into self-employment the endowment effect remains large and highly significant ($ß = 0.177$). In sum, we therefore find strong evidence for a generally positive and significant endowment effect (averaged for all individuals in the sample). The actual self-employed would have earned a higher wage than the actual wage-employed even if they had (counterfactually) stayed wage-employed. Hence, a sizeable part of the income derived in self-employment is due to better skill endowments.

For testing our hypotheses from Section 2, we estimate treatment and endowment effects for females, migrants and the migrant sub-groups separately. Hence, the interpretation for each effect had to be made in direct comparison with the treatment/endowment effect calculated for the corresponding comparison subgroups (e.g. treatment/endowment effect of males/non-migrants vs. treatment/endowment effect of females/migrants). In that respect, we can account for heterogeneous parameter estimates, as some variables may have an effect for one subgroup on the income but not for another.

We find that the treatment effect for the female self-employed is severely under-estimated (by some 60%) when using the unadjusted Oaxaca–Blinder decomposition (basic model: $ß = -0.036$; adjusted estimation: $ß = -0.085$). This contrasts with a positive and significant treatment effect for the male subsample ($ß = 0.044$). We therefore find that the self-employed males earn more than they would have earned if they were wage-employed, while the females earn less than they would have earned had they stayed wage-employed. This supports hypothesis 1a, self-employment pays a premium for males, but not for females.

As to the endowment effect, Table 4 reports that the endowment effect in the unadjusted model is significantly underestimated for females. The effect is about 50% larger (going from some 8% to almost 12%) when accounting for selection effects. Yet, the endowment effect for females is significantly lower ($ß = 0.119$) than it is for males ($ß = 0.161$). In general, the self-employed males exhibit a higher endowment effect that would bring about a higher income even if they (counterfactually) would have stayed wage-employed. This supports hypothesis 1b. Entrepreneurship is associated with a higher income for the females that decide to take this route (rather than staying wage-employed), yet male entrepreneurs still earn significantly more. Thus, entrepreneurship may alleviate some of the disadvantages that females face in wage-employment, but by and large female entrepreneurs earn around 5% less than male entrepreneurs.

As to our hypotheses 2a and 2b regarding migrants and non-migrants, we find that Germans who are self-employed exhibit a small (almost zero) treatment effect while the self-employed with a migration background benefit strongly and exhibit a significant treatment effect ($ß = 0.257$) in the endogenous switching model.[7] Hence, self-employment is associated with a sizeable premium for individuals not born in Germany. This supports

Table 4. Treatment effects based on OLS – Oaxaca–Blinder decomposition and endogenous switching model (*monthly income*).

		Basic model		Switching model	
	n	Treatment effect	Endowment effect	Treatment effect	Endowment effect
All	12,622	0.012** (0.006)	0.177*** (0.003)	0.029*** (0.001)	0.160*** (0.003)
Male	9505	0.027*** (0.007)	0.178*** (0.003)	0.044*** (0.002)	0.161*** (0.003)
Female	3117	−0.036** (0.013)	0.077*** (0.005)	−0.085*** (0.004)	0.119*** (0.005)
German	11,420	−0.014** (0.006)	0.176*** (0.003)	0.005*** (0.001)	0.168*** (0.003)
Migrant	1202	0.236*** (0.018)	0.125*** (0.007)	0.257*** (0.006)	0.104*** (0.007)
Turkey	287	0.370*** (0.033)	0.062*** (0.013)	0.279*** (0.020)	0.153*** (0.013)
South Europe	573	0.242*** (0.024)	0.103*** (0.009)	0.218*** (0.011)	0.124*** (0.009)
West/North/East Europe	236	0.226*** (0.019)	0.096* (0.053)	0.193*** (0.033)	0.129*** (0.019)

Notes: Standard errors in parentheses. The effects for the basic model are computed on the base of unconditional OLS-type income regressions as described in Section 3.2.1.
*Significant at the 10% level; **significant at the 5% level; ***significant at the 1% level.

Table 5. Treatment effects based on OLS – Oaxaca–Blinder decomposition and endogenous switching model (*hourly income*).

		Basic model		Switching model	
	n	Treatment effect	Endowment effect	Treatment effect	Endowment effect
All	12,622	−0.049*** (0.006)	0.076*** (0.003)	−0.040*** (0.001)	0.068*** (0.003)
Male	9505	−0.035*** (0.007)	0.067*** (0.003)	−0.026*** (0.001)	0.058*** (0.003)
Female	3117	−0.091*** (0.014)	0.025*** (0.005)	−0.151*** (0.003)	0.082*** (0.005)
German	11,420	−0.069*** (0.007)	0.083*** (0.003)	−0.082*** (0.001)	0.096*** (0.003)
Migrant	1202	0.127*** (0.020)	−0.002 (0.006)	0.183*** (0.006)	−0.058*** (0.006)
Turkey	287	0.232*** (0.039)	−0.052*** (0.012)	0.158*** (0.023)	0.024* (0.012)
South Europe	573	0.084*** (0.028)	−0.028*** (0.008)	0.071*** (0.011)	−0.015* (0.008)
West/North/East Europe	236	0.078 (0.055)	0.114*** (0.017)	0.204*** (0.028)	−0.012 (0.017)

Notes: Standard errors in parentheses. The effects for the basic model are computed on the base of unconditional OLS-type income regressions as described in Section 3.2.1.
*Significant at the 10% level; **significant at the 5% level; ***significant at the 1% level

hypothesis 2a. Also, we find that, despite being positive for both German ($ß = 0.168$) and the migrant self-employed ($ß = 0.104$), the endowment effect is significantly smaller for the latter group. The self-employed Germans exhibit a higher endowment effect that would bring a higher income even if they (counterfactually) would have stayed wage-employed. Hence, the migrant self-employed face disadvantages vis-à-vis the German self-employed and earn some 7% less based on their skill endowments. This supports hypothesis 2b and suggests that by and large migrant possess lower income relevant skills when becoming entrepreneurs.

The picture is subtler when we re-calculate the treatment and endowment effects using hourly income instead of monthly income (as depicted in Table 5). In sum, the effect for the complete sample of 12,622 year-observations of the self-employed still indicates a positive income differential. That is, in terms of hourly earnings entrepreneurs earn more than their wage-employed counterparts (treatment effect + endowment effect = −0.040 + 0.068 = 2.8%). However, this difference is considerably smaller compared to the monthly level (0.029 + 0.160 = 18.9%, see Table 4). More importantly, we see that the endowment effect

is cut in half compared to the effect of monthly earnings (6.8 vs. 16.0%). This indicates that a larger part of the endowment effect in the case of monthly income is due to the longer working time by the self-employed (=higher work effort). All in all, and central to our argument, there remains an endowment effect of 6.8% which can still be interpreted as a sign of their higher ability. Interestingly, we see a diverging picture as to the treatment. On the hourly level, the treatment effect is now negative indicating that entrepreneurs are incurring a penalty when becoming self-employed. But in aggregate, our results on the monthly level show that there is still a small but positive treatment effect at the end of the month. Hence, entrepreneurs need to trade off monthly income (a 3% premium) and longer working hours (9 more hours of work). As to the magnitude of the trade-off we find differences between the outcomes reported for hourly and monthly income. The financial penalty, and thus the trade-off between income and longer working hours, is more prevalent for females than for males ($ß = -0.151$ vs. $ß = 0.026$), and for Germans vs. migrants ($ß = -0.082$ vs. 0.183). Especially for females, the reported treatment effect becomes more negative, resulting in an aggregate financial disadvantage on an hourly basis (treatment effect: –0.151; selection effect: 0.082). Similarly, the treatment effect for migrants becomes smaller (0.183) and the selection effect turns negative (–0.058). While the direction of both effect remain consistent with the hypothesized direction, it is important to note that for Germans the treatment effect turns into a financial penalty on an hourly basis. Here the trade-off between financial income and additional working hours is most prevalent as the additional effort can at best only make income in self-employment equal to income in regular employment.

Our data also includes information on individuals' country of origin. We therefore explored the group of migrant entrepreneurs further by disentangling endowment and treatment for the respective subgroups. Due to the small number of foreign-born self-employed for some nationalities, we focus our analysis on the largest three subgroups: Individuals from Turkey, from Southern Europe (Italy, Spain, Greece) and from other European countries. The results show that migrants from Turkey exhibit both an endowment and treatment effect that is higher compared to other European migrants. The results indicate that among the different sub-groups the Turkish migrants earn substantially more ($ß = 0.279$) than Southern Europeans ($ß = 0.218$), and West/Northern Europeans ($ß = 0.193$). This is especially noteworthy, as the treatment effect for German nationals is only about 3%. Hence, the decision to become self-employed generally pays off for migrants. Yet, as to the endowment effect we find that migrants are generally characterized by a significantly lower endowment effect. That is, even if they had stayed wage-employed, they would have earned less than the German natives due to their skills alone. For Turkish migrants the effect ($ß = 0.153$) is only slightly smaller than for Germans ($ß = 0.168$), differences are larger for Southern Europeans ($ß = 0.124$) and Northern Europeans ($ß = 0.129$).

4.3. Time trends in treatment and endowment effects

Lastly, we have brought forward that endowment and treatment effects might be affected by institutional and cultural reforms along the lines of the growing European integration. As we observe a long time period of 29 years from 1984 to 2012, we are able to explore possible time trends of the theorized effects. Subsequently, we divide our sample into six sub periods that reflect important milestones in forming and strengthening the European Union (see Figure 2). We begin our analysis with the time leading up to the fall of the Berlin

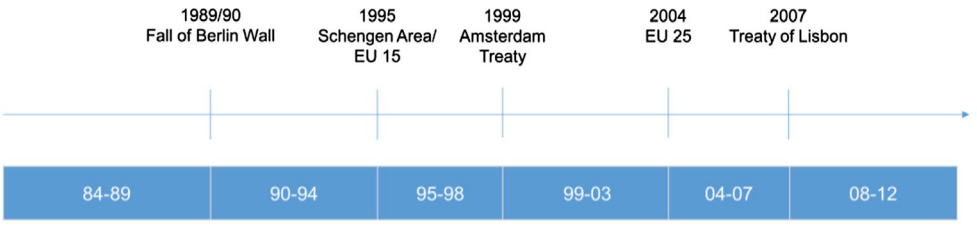

Figure 2. European milestones in the observation period.

Wall in 1989, which constitutes the first milestone. The second sub period runs up until the introduction of the Schengen agreement and the enlargement of the European Union to 15 countries in 1995. These two events strengthened the single European market. In 1999, the EU member states signed the Amsterdam treaty that advanced the common immigration legislation in Europe, which marks the conclusion of our third time period. Five years later, the EU was enlarged again by ten mostly Eastern European countries making it easier for individuals originating from these countries to work in the incumbent EU 15 countries. In 2007, the Treaty of Lisbon was signed by the member states, aiming to make the EU more efficient and coherent, which comprises our fifth time interval. The last time period runs until the end of our data to the end of 2012.

Firstly, we observe that the positive treatment effect (returns to entrepreneurial activity) for men is decreasing and converging towards zero during the whole observation period (see Figure 3). Opposite to that, treatment effects for women remain, apart from the sub period 1990–1994, continuously negative. They are much more volatile than for men, though. Endowment effects remain rather stable for both genders, whereas the levels for men are above those for women in most periods. All in all, our observation of a significantly lower treatment effect for women remains robust over the whole period from 1984 to 2012. This may indicate that women still pursue entrepreneurial activities out of different and not necessarily monetary-driven motivations, as we predict in our hypothesis 1a. However, treatment effects for men show that also men do not financially benefit from self-employment anymore (Figure 3).

Similarly, treatment effects for migrants having been increasing ever since, and peaked during the time of the Schengen agreement that made movements across countries easier. Yet, the recent years of EU enlargement are characterized by lower treatment effects. With more and more migration and the expansion of the European Union to eastern European countries, returns to entrepreneurship appear to decline. This also evident in the declining endowment effect, being reflective of income relevant skills. While the effect amounted to some 20% during the early years of the EU integration, the trend seems to go into the opposite direction with individuals bringing less and less income relevant skills. Endowment effects seem to be converging at the level of around 10–15%. Not surprisingly then, Germany has seen public outcries due to skills shortage, despite more migration. It appears, as if the migrant self-employed from EU-15 countries were better skilled than the migrant self-employed from the enlarged EU area. Though, it may also be that some sectors such as health care and construction (which are less demanding in terms of human or financial resources) have seen an increased entry from individuals from the new member states, which in fact, would imply a sectoral shift in self-employment.

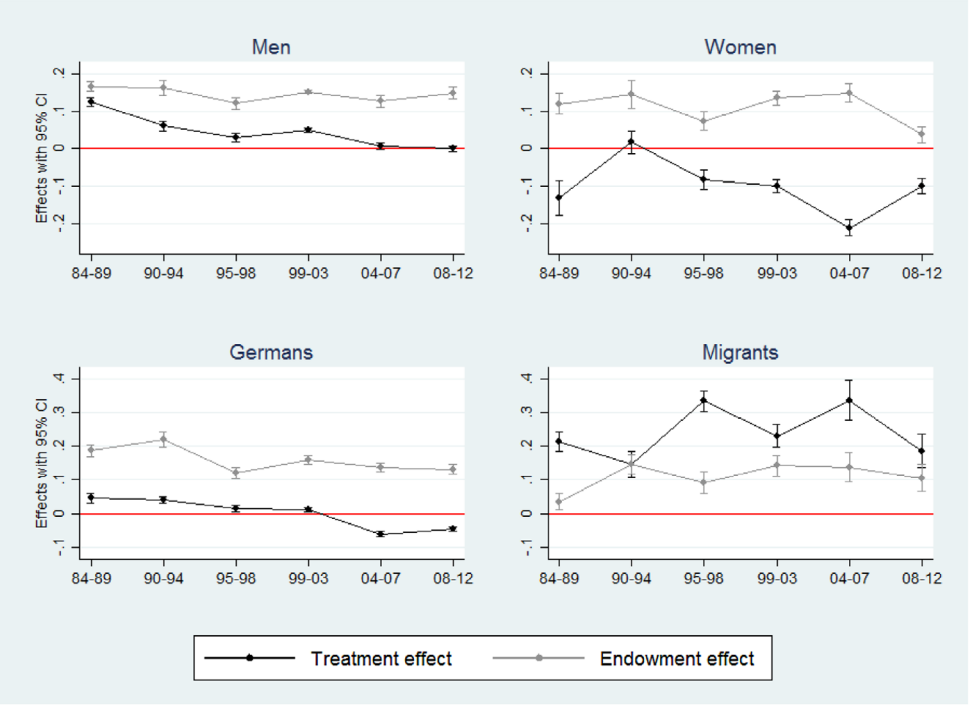

Figure 3. Treatment vs. endowment effects – Time trends.
Note: Tabulated with 95% confidence intervals.

5. Discussion

Drawing on a 29-year longitudinal study of income dynamics of a representative population we disentangle endowment and treatment effects in entrepreneurship in Germany. We believe that heterogeneity in the entrepreneurial population is an important and under-researched empirical phenomenon. Our study therefore attempts to bridge this important research gap. We begin our assessment by suggesting that there are two central questions that remain open and need to be addressed jointly: (a) What is the difference in actual earnings for the entrepreneur and the earnings they would have received if they were not an entrepreneur (treatment effect)? And (b) what is the difference in earnings between the two groups if both were not entrepreneurs (endowment effect)?

In particular we draw inferences if and how these effects differ across gender, migration, and cultural backgrounds of the population and how the individual effects vary across time. Hence, we not only account for entrepreneurial activity at large, but also investigate whether or not balance and cohesion in entry and earnings among population subgroups is achieved.

Firstly, we find that entrepreneurs earn 19% more than wage-employed individuals. These findings are in line with prior evidence that the self-employed in Germany earn, on average, more than wage-employed workers (OECD 1992, 164; Braakmann 2007; Fritsch, Kritikos, and Rusakova 2012). Yet, an unadjusted model does not explicitly explain where the 19% baseline differential actually stems from. Is it because the more able select into entrepreneurship? Our model helps to answer this very question.

Our results show that the earnings differential between the self-employed and the wage employed is driven by a larger endowment effect that accounts for about 16% points of the wage differential. This effect is due to a higher endowment with income-relevant characteristics such as education or previous work experience, for instance, but also to a higher work effort measured by working time. In a further analysis, we show that the considerably longer working hours of self-employed individuals account for more than half of the effect. The treatment effect only accounts for some 3% points. Hence, the difference in earnings between the self-employed and the wage-employed is driven by differences in abilities and work effort that would make the self-employed earn more even if they had stayed wage-employed.

The endowment effect of some 16% reflects higher abilities and work effort among the self-employed. The additional positive treatment effect (using monthly income) of some 3% indicates the income effect solely of being self-employed and controlled for differences in terms of abilities, yet when controlling for work effort using hourly income, the treatment effect becomes negative, indicating a small financial penalty on an hourly basis. To sum up, entrepreneurs in Germany earn more than wage-employed individuals on a monthly basis, yet they primarily do so because of higher abilities and a higher work effort.

The main reason for this can be attributed to structural differences regarding entrepreneurship in the United States (Hamilton) and Germany (our study). There is evidence that the self-employed in Germany earn, on average, more than wage-employed workers. An OECD report describes this finding already at the beginning of the 1990s (OECD 1992, 164). Braakmann (2007) shows that entrepreneurs in Germany are more likely to be at the top of the income distribution. Fritsch, Kritikos, and Rusakova (2012) find that the bigger part of switchers from wage- to self-employment can increase their income.

Self-employment in Germany has long been dominated by better educated individuals. Entry barriers have historically been relatively high. In fact, up until the early 2000s Germany legislated the necessary criteria and education required to found a new business. These drastic regulations lack examples in other comparable economies. Throughout the 1990s (and with minor revisions in 1994 and 1998) the 'Craft Regulation Act' (Handwerksordnung) constitutes an effective barrier to entry (Lechner and Pfeiffer 1993). It allowed only those individuals to become self-employed that earned 'a degree as master of a trade […] in 126 occupations'. It was only in 2004 that these regulations had been loosened. Eventually, the number of occupations with master requirements declined to 41 in 2014. Our results reflect this specific regulatory environment, describing a sizeable endowment effect (= higher abilities) which declines over time. Our results concerning the population subgroups suggest that there are indeed severe differences between males and females. We find support for our first hypothesis, that female entrepreneurship is (relative to male entrepreneurship) associated with a significantly lower treatment effect. While self-employed males earn about 4% points more due to the decision to become self-employed (holding their abilities constant) females that become self-employed actually earn about 9% points less than the wage-employed females.

Also, we found support for our second hypothesis that female entrepreneurship is (relative to male entrepreneurship) associated with a significantly lower endowment effect. While self-employed males would earn some 16% points more than wage-employed males even if they are wage-employed, this effect accounts for 12% points for females only. This suggests that due to the restraints women put on themselves, or others put on them (for example

discrimination, or social norms), the characteristics that determine earnings regardless of employment sector choice are less distinct.

Next, we hypothesized that the endowment and treatment effect will differ for migrant and non-migrant entrepreneurs. Our results show that migrant and non-migrant entrepreneurs place a seemingly different emphasis on entrepreneurship. In line with our hypothesis, we find that migrant entrepreneurship (relative to German entrepreneurship) is associated with a significantly larger treatment effect. While German natives only earn less than one percentage point more due to the self-employment decision alone, migrants earn some 26% points more when becoming self-employed. As such, we find strong evidence that migrants use entrepreneurship as a path for socioeconomic advancement. Rather than staying put these migrants with entrepreneurial spirit move to improve their living conditions, despite the hardship this may bring about. This resonates well with an increased German effort to spur the development of migration run firms (Leicht and Werner 2013). Also, we find evidence that despite a higher treatment effect, the endowment effect for migrants is some 6% points lower than for non-migrants. Hence, often discussed disadvantages of migrants (for example, related to poor language skills and likely unrecognized qualifications) might prevail and cause lower earnings that non-migrants would reap of their higher skills. However, migrants exhibit a lower probability of becoming self-employed so that the entry barriers in the first place seem to be higher as for native Germans.

With respect to the different measures employed, we find a positive treatment effect for males and migrants using monthly income. Females incur a sizeable financial penalty when becoming self-employed. When using hourly income, we find a sizeable financial penalty for females and Germans, but still a positive treatment effect for migrants. As such, females and Germans in our sample have to financially trade-off additional income and additional working hours. While longer working hours might result in a higher monthly income, the marginal value of an additional working hour is reduced.

Hence, with respect to our hypotheses 1b, we find evidence that female entrepreneurship is (relative to male entrepreneurship) associated with a significantly lower treatment effect. When using hourly income the financial penalty for females becomes even larger. Hence, more working hours would be necessary to make up for the lower treatment effect. Also, we find similar evidence for hypothesis 2a that (relative to non-migrant entrepreneurship) migrant entrepreneurship is associated with a significantly larger treatment effect using monthly and hourly income. Again, the financial penalty for Germans becomes larger when focusing on hourly income rather than monthly income. While self-employment pays for migrants, it does not necessarily provide financial benefits for Germans.

As to the cultural background (country of origin) we see disproportionate differences in treatment and endowment effects. Treatment effects are highest for migrants from Turkey, and seemingly lower treatment effects (by some 6–8% points, though higher as for Germans) are observed for individuals coming from other countries of southern Europe and the remainder of Europe. This gives further credence to the notion that entrepreneurship, especially for Turkish migrants, is a viable and financially attractive option and not driven out of necessity and/or precarious motives (Leicht, Berwing, and Langhauser 2015) Endowment effects are lowest for individuals coming from southern European countries. While individuals from a Turkish origin benefit the most, individuals from southern European countries are less well equipped to become entrepreneurs in Germany – a phenomenon that has already been reported for Italian immigrants in Germany over a decade ago (Leicht, Leiss, and Fehrenbach

2005). Lastly, we have also seen that with more and more migration and the expansion of the European Union to eastern European countries, returns to entrepreneurship appear to decline.

Taken together, our findings provide insights into the understanding how entrepreneurial entry and subsequent earnings differ across population subgroups. This has significant implications for both the pedagogy of entrepreneurship education and the support of entrepreneurial activity. Drawing conclusions, such as 'becoming an entrepreneurs is socially desirable and pays off financially', may be premature without accounting for a more comprehensive understanding of how various individuals fare and for whom treatment and endowment effects are higher. Examining the culmination of the entrepreneurial journey primarily by outcomes disregards important differences in antecedents, motivations, and skill endowments.

6. Conclusion

Our work highlights the need to disentangle endowment from treatment effects. Here the study goes beyond past research that equates income effects with individual-level endowments. It also advances beyond past research that mainly neglects individual-level antecedents to entrepreneurship.

The endogenous switching model employed in this paper both corrects for selection into entrepreneurship and accounts for different income determinants in entrepreneurship and wage-employment simultaneously. We find that entrepreneurs exhibit a positive endowment effect, meaning that they even would have earned a higher income in wage-employment than the actual wage-employed workers have. We also find a positive (albeit small) treatment effect of self-employment. However, we find negative treatment effects and distinctly smaller endowment effects for females. Along these lines, we also find large treatment effects for migrants, yet with lower endowment effects. Among the countries of origin Turkish migrants benefits the most from their self-employment decision, while other southern Europeans exhibit the lowest income relevant skills.

We see that in the population sub-groups the self-employed exhibit, on average, higher income-relevant skills and perform higher work efforts than their wage-employed counterparts. This indicates that the entrepreneurial sample is highly selective in terms of general education. Generally, however, entrepreneurship pays off individually for many entrepreneurs.

The recent Global Entrepreneurship monitor reports a nascent rate of 2.2% for Germany which is comparable to other established economies such as the US and the UK (Bosma and Levie 2010; see also Fritsch, Kritikos, and Sorgner 2015). In fact, it seems that these positive effects are in part attributable to migrant entrepreneurship. It stands to reason that endowment and treatment effects are affected by changes in regulatory requirements and the simultaneous societal changes.

Entrepreneurship education and policy often involves practices that are promoted and taught as 'one size fits all' solutions that rarely take into account (or establish) factors that recognize either the cognitive approach individuals take, or personal or cultural backgrounds. In fact, our results show that for some individuals lower earnings might be explained by differing motivations to become entrepreneurs (non-pecuniary motivations for women and disadvantages in the regular labour market for foreigners) but also that endowments might

differ widely. This heterogeneity may also account for some of the debate regarding the merits of entrepreneurship for individual earnings, as well as the somewhat ambiguous empirical outcomes.

Notes

1. As with the extant literature (see Hamilton 2000; Parker 2004) we employ the terms self-employment and entrepreneurship in the following way. At the conceptual level, we use the term 'entrepreneur' and entrepreneurship, while at the practical level, involving measurement and estimation, we use the term 'self-employment' (Parker 2004, 6).
2. We use data from the 29th wave (doi:10.5684/soep.v29). For further information on SOEP, see Wagner, Frick, and Schupp (2007).
3. Generally, due to selection effects one may wish to estimate a Heckman selection correction, yet such a model is not able to accommodate heterogeneous parameter estimates, there is a only a selection and second stage equation and second stage parameter estimates are assumed to be homogenous. This is especially important, as marginal effects of control variables may vary across the self-employment and wage-employment groups (Astebro and Chen 2014).
4. In order to get the exact effect, one has to transform the coefficient *ß* by the exponential function. For small values of *ß*, the coefficient is very close to the exact effect.
5. We also include two dummy variables which inform about a potential self-employed occupation of the mother and the father when the individual was 15 years old. These variables serve as instruments for the identification of the selection into self-employment. In line with the literature on intergenerational transmissions in terms of occupational choice (Storey and Greene 2010; Lindquist, Sol, and Van Praag 2015) we contest that entrepreneurial role models in the family strongly trigger the selection into self-employment, but not necessarily affect earnings directly.
6. In econometric terms, the equation for computing the expected values $E\left[Y_1|X_1\right]$ and $E\left[Y_0|X_0\right]$ is extended by the inverse Mills ratio which is generated from the coefficients of the selection equation. Hence, it adjusts the expected values for the selection into self-employment.
7. A similar positive (yet, unadjusted) income difference has also been reported in Block, Sandner, and Wagner (2011). While Block, Sandner, and Wagner (2011) control for endowments using fixed effects we explicitly disentangle treatment and endowment effects following our hypotheses. All in all, effect sizes are comparable and most importantly, remain sizeable when adjusting for self-selection.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix

Variable	Description
Self-employed	Dummy for a self-employed worker
Gross monthly income	Monthly income in Euro of prices in 2012: wages and salaries for wage-employed people, retained earnings for self-employed people
Father self-employed	Dummy if the father was self-employed at individual's age of 15
Mother self-employed	Dummy if the mother was self-employed at individual's age of 15
Fulltime experience	Cumulated years of fulltime work during the whole working life
Parttime experience	Cumulated years of parttime work during the whole working life
Unemployment experience	Cumulated years of unemployment during the whole working life
Satisfaction with health	Satisfaction with individual health status from 0 'totally dissatisfied' to 10 'totally satisfied'
Female	Dummy for a female worker
Migrant	Dummy for a worker who was not born in Germany
Child under 16 in household	Dummy for a worker with at least one child under the age of 16 in her/his household
Age	Current age of the worker (in years)
Schooling	Years of education at school and university (7 = no schooling degree, 18 = university degree)
In occupation trained for	Dummy for a worker whose occupation is the same in which she/he was trained
Tenure	Tenure with the current firm (in years)
Weekly working time	Actual working time per week (in hours)